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# Memory Span and Narrative Skills – Where’s the Connection?

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## Introduction

Language and cognition are two interesting and perhaps linked aspects of child development. Recent studies support that executive functions are deficient in monolingual-language-impaired children (Henry, Messer & Nash, 2011). To explore this area, and shed light on the possible association between language and executive functions in typically developing children, we investigated the connection between children’s narrative skills (telling and retelling tasks) in the Fox and Bus story, and their memory span measured on an Odd-one-out task (Henry, 2001). Prediction: we predict a stronger correlation between the Bus story retelling task and memory span than between the Fox story telling task and memory span.

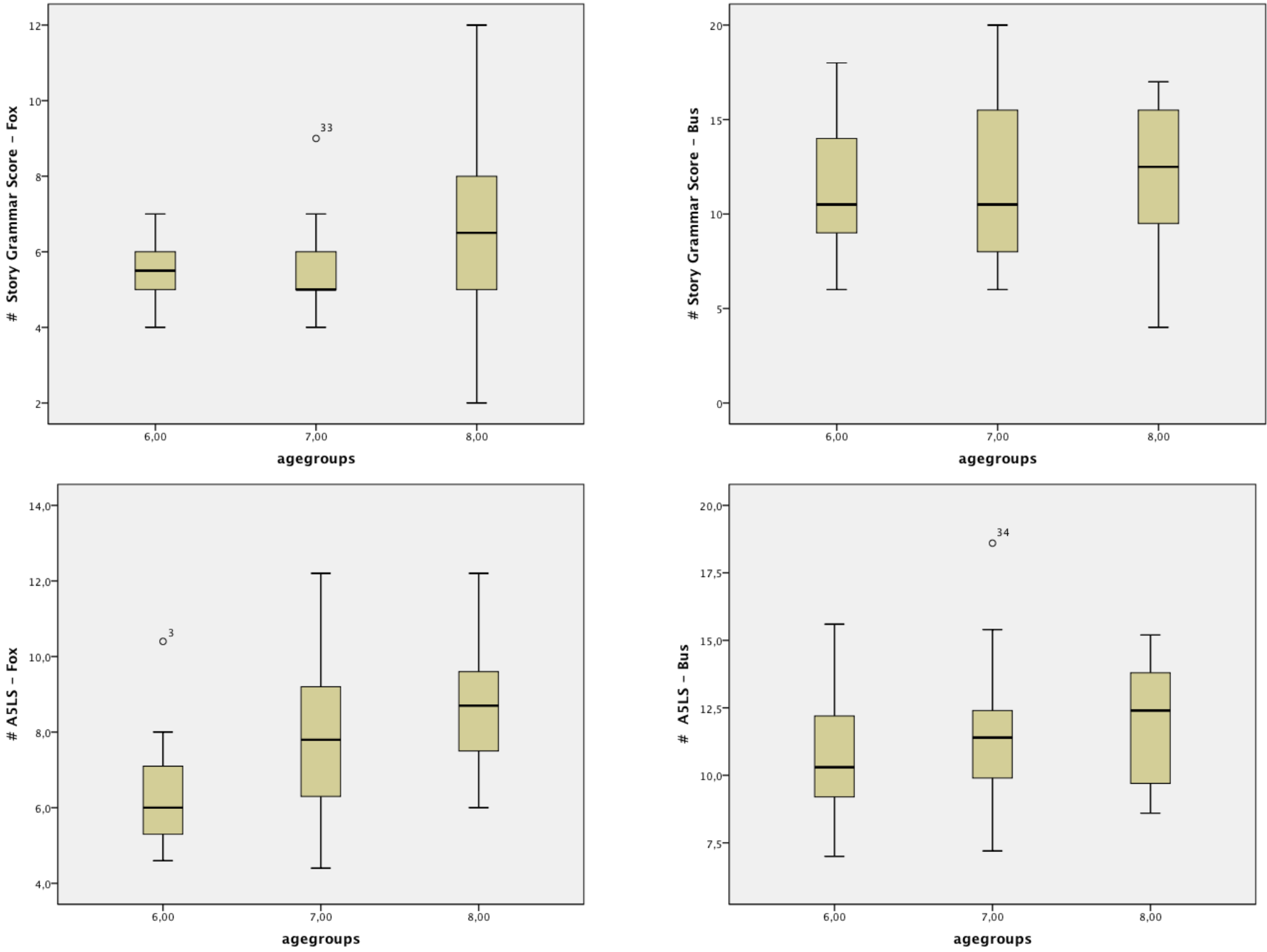
## Method

**Participants:** 60 Danish typically developing monolingual children, 30 girls, 30 boys, aged 6 to 8 years (mean age in month = 90,4, SD= 10,2).  
**Materials:** Bus story plus COST materials from respectively WG 2: Fox story, and WG 4: Odd-one-out.  
**Procedure:** the test materials were administrated to each child during school hours in the following order: Odd-one-out, Fox Story, Bus Story  
**Coding:** For the Odd-one-out two substantial scores were calculated, first the child was credited a score for each correct remembered item (possible score range 0-24), second the child’s span score – the number of spans passed – was calculated (possible score range 0-6). Both narrative tasks were coded for micro structure calculated by mean length of the five longest sentences (A5LS), and macro structure assessed by story grammar containing the overall categories: setting, initiating event, goal, attempt

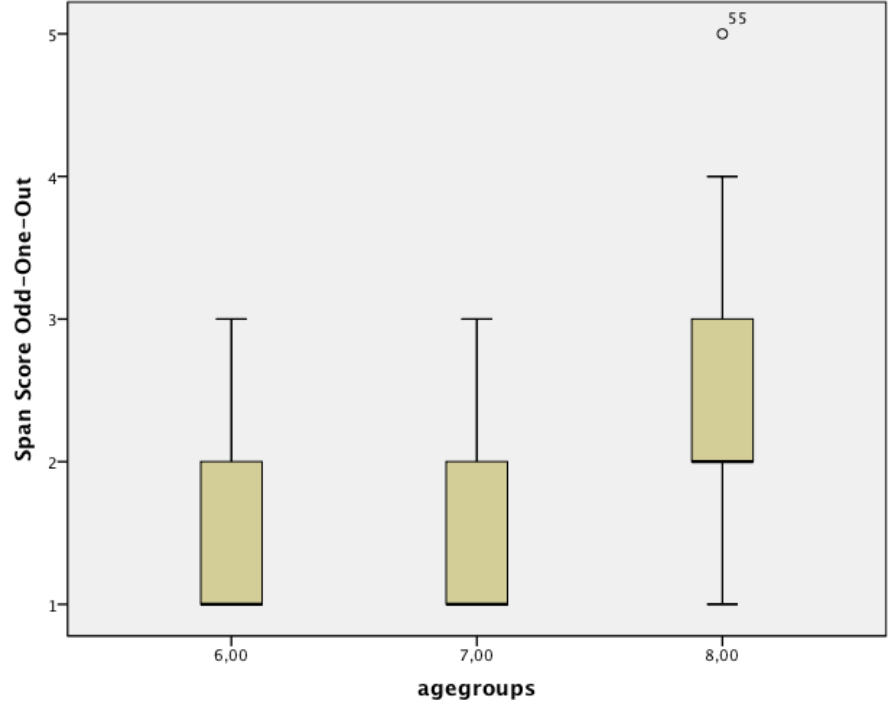
## Results

	Fox comp.	Fox A5LS	Fox storygram	Bus, words recalled	Bus A5LS	Bus storygram
<b>M</b>	8,35	7,57	5,87	9,83	11,42	11,72
<b>(SD)</b>	(0,97)	(2,05)	(1,18)	(3,18)	(2,38)	(3,85)

**Narrative tasks:** Table 1 above shows the means on all of the narrative tasks included in the study. The two boxplots at the top shows the three age groups’ scores on macro structure for respectively Fox story and Bus story. Story Grammar for Fox showed a significant effect of age ( $F = 3.23$ ,  $p = .047$ ). Posthoc Bonferroni tests showed a non-significant effect between all of the age groups. For Bus story a one-way ANOVA showed a non significant overall effect of age. The bottom boxplot shows the groups’ scores on micro structure for Fox and Bus story. For Fox A5LS a one-way ANOVA showed an overall significant effect of age ( $F = 9.38$ ,  $p > .01$ ). Posthoc Bonferroni tests showed significance for all three age groups. For A5LS for Bus story a one-way ANOVA showed no significance.



**Odd-one-out:** The boxplot on the right shows how the span scores of the three age groups are distributed. A one-way ANOVA showed an overall significant effect of age ( $F = 8.80$ ,  $p = .01$ ). Posthoc Bonferroni tests showed a significant difference between the span of the 6 year-olds and the 8-year-olds ( $p = .002$ ), but not for the remaining age groups. A Pearsons R shows a significant correlation (.381) between age and span score. An independent t-test showed no gender differences for either Odd-one-out scores.



**Correlations:** We predicted that the correlations between working memory and narrative skills would be stronger for the Bus retelling task than the Fox telling task. Interestingly, the correlations were opposite of the expected, as the correlation table beneath shows a higher, positive and significant correlation between Fox story grammar and both scores in Odd-one-out than between Odd-one-out and Bus story grammar. Total number of difficult words remembered in Bus story does however have a significant correlation with total number of correct remembered items in Odd-one-out. It is also noteworthy that none of the correlations are higher than .334, indicating a rather weak correlation between memory span and narrative skills.

	Odd-one-out correct items	Odd-one-out span level
Fox comprehension	.217	.214
Fox A5LS	.334**	.225
Fox storygrammar	.314*	.276*
Bus remembered words	.277*	.207
Bus A5LS	.244	.210
Bus storygrammar	.192	.156

\*  $p < 0.05$ ; \*\*  $p < 0.01$

## Discussion

**Coding issues:** The fact that this study shows that memory span has a higher correlation with a telling than a retelling narrative task could perhaps originate in coding issues: It is possible that the complexity of the story grammar of the two stories is not identical, thereby giving different results for the two set of scores for story grammar.  
**BiSLI:** The results from this study indicate that test materials for narratives are very sensitive – even in a within subjects analysis. The results therefore underline the need for balancing and controlling test materials when testing bilingual children. When using two narrative tasks, one cannot be prompting better scores than the other, since this could cause different results that is do to the method and not a difference in language abilities.  
**Diagnostics:** That working memory correlates differently with different measurements for narratives is also worth noting as regards to the development of clinical tools for identifying children with SLI. All of these considerations call for methodological awareness in developing appropriate and valid testing tools.

## References

Odd-one-out: L. Henry, D. Messer and G. Nash (2011), L. Henry (2001), Bus story: C. Renfrew (2010), Fox story: COST WG 2  
  
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